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United States Coast Guard

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COMDTNOTE 16500
JULY 30, 2002

COMMANDANT NOTICE 16500

CANCELLED: JULY 29, 2003

Subj: EQUIPMENT FOR DISCREPANCY BUOY/SMALL LIGHTED BUOY APPLICATIONS

1. PURPOSE. This Notice introduces new Light Emitting Diode (LED) equipment approved for use in conjunction with foam buoys as Lighted Discrepancy Buoys and Small Lighted Buoys.
2. ACTION. Area and district commanders shall ensure that all units with responsibilities for servicing aids to navigation are aware of the information in this Notice. Internet release authorized.
3. DISCUSSION. The Coast Guard initiated testing in 1999 of integrated, self-powered LED marine signal lanterns in ATON applications. The Carmanah 700 series solar powered lantern has been judged to be suitable for use on aids to navigation needing a nominal range of 3 nautical miles or less. The lantern is self-contained, housing all the components necessary to provide a marine signal with no additional apparatus. It is specifically adapted for use on the recently modified 5th class foam buoy, and this buoy/lantern combination is intended as the modern replacement for the old lighted discrepancy buoy, which will be discontinued. Use on other platforms and ATON stations are permitted at the discretion of district aids to navigation offices. All standard flash rhythms are available and red, green, white and yellow (amber) colors can be displayed. The lantern is programmed with an ordinary TV remote control using a unique security code. Procurement instructions for both the 5th class foam buoys, the lanterns and replacement parts are detailed in enclosure (1). Enclosure (2) contains performance information and guidance for the set-up, installation and maintenance of the self-contained signal lantern.

J. A. KINGHORN

- Encl: (1) Ordering Instructions for the Carmanah 700 Series LED Lanterns and 5th Class Lighted Foam Buoys
(2) Carmanah LED Lantern Selection and Installation Instructions

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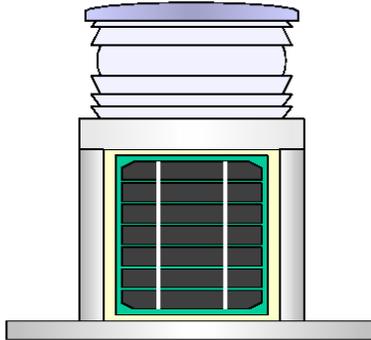
Ordering Instructions
for the
Carmanah 700 Series LED Lanterns and
5th Class Lighted Foam Buoys

1. Fifth Class Foam Buoys are manufactured by The Gilman Corporation, P.O. Box 68, 34 Gilman Road, Gilman, Connecticut 06336, phone: (800) 622-3626. Prices for the 5CFR, 5NFR and replacement parts are available on the Ocean Engineering website: <http://www.uscg.mil/systems/gse/gse2> under Products/Services, Foam Buoy Price List. Obtain the current price and relevant shipping information and send a funded procurement request to COMDT (G-SEC-2B); they and our contracting office will issue a delivery order to The Gilman Corporation. The buoy contains a revised top plate that allows it to be used as either an unlighted or lighted buoy.
2. 700 Series LED Lanterns are manufactured by Carmanah Technologies Inc., Building 4, 203 Harbour Road, Victoria, British Columbia, Canada V9A 3S2, phone: (877) 722-8877, website: <http://www.carmanah.com>. Lanterns may be purchased on-line or by phone using a Government credit card. They are available in three versions, the 701, 702 and 702-5 series. All three produce the same intensity; the difference is the size of the solar panels and internal battery. Based on the intended location and flash rhythm, Carmanah will determine which lantern is suitable for the application. Generally, northern latitudes with high duty cycle rhythms require either the 702 or 702-5 series lantern. The buyer specifies the color (red, green, white or yellow), but not the flash rhythm; depending on the intended location, the rhythm is programmed by the CG unit. A dedicated TV remote or Carmanah programmer is required to set the proper flash rhythm.

Prices for the lanterns are available on the Carmanah website. Prices for replacement components, an external battery charger and programmer (if a spare TV remote is not available) are listed on the G-SEC-2 website: <http://www.uscg.mil/systems/gse/gse2> under Products/Services, Aids to Navigation Equipment List, Lantern, LED.

CARMANAH LED LANTERN SELECTION AND INSTALLATION INSTRUCTIONS

This document provides performance data and instructions for installing the Carmanah 700 series LED lanterns on Coast Guard lighted aids to navigation.



Description

The Carmanah 700 series are self-powered omnidirectional LED lanterns. The solar panels, battery, flasher, daylight control and lantern assembly are housed as a single unit. The entire assembly shall be programmed and tested prior to deployment.

Selection

The lanterns are available in red, green, white and yellow. All standard and nonstandard rhythms, with the exception of fixed rhythms, have a nominal range of 3 nautical miles. Aids exhibiting a fixed rhythm have a range of 2 nautical miles.

Charging

The lanterns are charged prior to shipment. If it is not installed within two months of receipt, and at 6-month intervals during long-term storage, the lantern shall be recharged as prescribed below.

Remove the lantern from the shipping container. It should arrive programmed OFF, (i.e., it will not flash in a darkened room). Place the lantern outside in direct sunlight. The battery will be recharged (with the unit programmed OFF) in 60 hours of direct sunlight. 60 hours does not

include nighttime, so if the lantern receives sun for 6 hours per day, it will take 10 days for it to fully charge up.

An alternative is to purchase an external charger from Carmanah and the access tool for the tamper resistant Allen screw (see our website: <http://www.uscg.mil/systems/gse/gse2>; the 5/32" tamper resistant Allen wrench may be purchased from Carmanah or McMaster Carr Supply Company, 732-329-3200, part number 7390A27). The charger will recharge the battery in a fraction of the time, however specific procedures must be followed or damage to the battery and/or control unit will occur.

- Use the modified Allen wrench to remove the four fasteners from the top of the lantern.
- Disconnect the connector to the solar panels. This will allow you to separate the base from the optic head (it is important that the solar panel is disconnected first).
- Disconnect the connector to the batteries.
- Attach the proper external charger pigtail to the connector feeding the battery.
- Measure the voltage at the pigtail.
- Based on the voltage measurement, charge the battery in a well ventilated area for the following amount of time:

<u>701 Lantern (15 amp-hours)</u>	<u>702 & 702-5 Lanterns (24 amp-hours)</u>
4.14 volts or higher - 5 hours	7 hours
3.98 volts to 4.13 volts - 15 hours	18 hours
3.86 volts or lower - 20 hours	27 hours

Do not charge the battery longer than the time specified. Overcharging can cause hydrogen gas to vent, which can consequently reduce the battery life.

Make sure that the plugs on the charger do not touch each other.

- Replace the gasket if the lantern was previously in service. The gasket needs to be perfectly seated in the channel. Start at the corners and work in towards the center of each side.
- Reconnect the battery wires first.
- Then reconnect the solar panel wires.
- Secure the optic head with the vandal proof machine screws. Tighten them very well in order to insure the proper seal between the gasket and the housing.

Programming

The color of the lantern cannot be identified by the appearance of the lens or LEDs when they are off. A colored dot will be painted on the plate mounted in the lens near the serial number, company name and address. On 702-5 lanterns, the dot will be painted beneath the base.

A LED lantern programming shroud, (essentially a wrap that covers the solar panels but leaves the lens area open for programming and visual confirmation of the flash rhythm) may be fabricated

from any opaque material. This cover is necessary to check the daylight control function of the Carmanah LED lantern after installation and should be used to program the proper flash rhythm before initial deployment. Programming is accomplished with a TV remote control set to communicate with the lantern. If the lantern does not respond to the controller, or if the batteries are removed, reprogram the controller by pressing CODE SEARCH until the red light comes on, then the TV button, then enter 0 0 6.

Programming is accomplished after the lantern changes from day/night or night/day. It is preferable to program the lantern in the night mode, out of direct sunlight and strong indoor lights.

If stored in a brightly lit area, cover the lantern by placing the shroud around the solar panels, and the top solar panel (702-5 only). If stored in a dark area, move to a brightly lit area and wait 2 minutes, then cover the lantern, as described above. If the lantern does not respond to programming, move the lantern from dark to light and light to dark a few times to “wake up” the processor.

Programming must be started within 1 minute. The lantern responds after each entry with a 1/4-second flash. A double flash means it did not recognize the entry. Reenter that number until the correct confirmation is displayed.

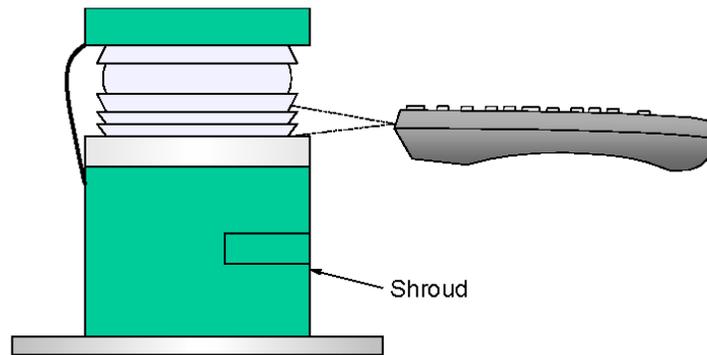


Figure 1.

- **Aim the controller at the lower portion of the lens, as shown in Figure 1.**
- **Enter the security code:** POWER, 7 5 3, CHAN^. After CHAN^ a flash followed by a very quick flash indicates successful entry of the security code.
- **Enter code 911:** POWER, 9 1 1, CHAN^. 9 1 1 is intended to clear the memory of all previously entered codes, and to introduce a known, cleared state. If the light is transitioned and not cleared of its OFF code, it will turn itself off again due to the instruction it has in memory.

- **Enter the security code again** before entering the desired rhythm: POWER, 7 5 3, CHAN^.
- **Enter the desired rhythm:** POWER, # # #, CHAN^.

The following codes refer to our standard rhythms. More rhythms are detailed in the instruction manual supplied with the lantern:

014	FL(2)6	073	FL6(0.6)	129	Q
022	FL(2+1)6	081	Iso 6	175	FL(2)5
049	FL2.5(0.3)	095	Mo(A)	000	OFF (for storage)
063	FL4(0.5)*	118	Oc 4		

*Slightly different than our standard FL4(.4) rhythm, but will be similar in appearance.

- Check the rhythm with your watch and bench test for 8-24 hours with the shroud on. If the beacon will not be deployed within 1-2 days, then remove the shroud and store outside in the sun or program the lantern to OFF, as described above.

Installation

The lantern may be installed on the recently modified 5th class lighted foam buoys, structures and steel buoys where the operational range requirements are met for the specific color and flash rhythm. Three bolts protruding from the top-plate of the buoy or three leveling studs on structures are used to secure the lantern. However, the bolts will shadow the solar panels if they extend too far. Therefore, install three nuts on the bolts (similar to installing a lantern on a structure) so that about 1” of thread is exposed. Be sure that the nuts are the same distance from the top-plate so that the lantern is “level” on the buoy. On structures, place a torpedo level on the base plate of the lantern. Adjust the leveling studs so that lantern is level in two directions. Use the “T” method described in the Short Range Aids to Navigation Servicing Guide COMDTINST M16500.19A.

Be sure the lantern is properly programmed prior to installation. Install the lantern on the bolts and secure with a lock washer and nut, as shown in Figure 2.

If the lantern is installed directly on the top-plate of a steel buoy with bolts facing down (to minimize the protrusion), install an insulating nylon washer on each bolt between the lantern and top-plate to prevent crevice corrosion.

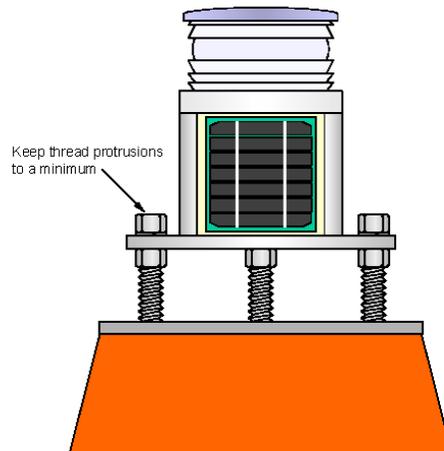


Figure 2.

Service Life

LED lanterns generally do not burn out, but light output degrades over time to a point that the light may not meet the operational range. Therefore lanterns shall be removed from service according to the following schedule:

<u>Duty Cycle</u>	<u>Service Life (nighttime operation)</u>
10% to 29%	12 years
30%-100%	8 years

Although overall battery life is yet to be determined through field trials, schedule replacement of the battery pack to coincide with the service life of the lantern, not to exceed 4 years. For example, a **FL6(.6)** rhythm has a 10% duty and a service life of 12 years. Schedule replacement of the battery pack at 4-year intervals.

Servicing

Servicing should be performed in accordance with the standard cycle established for the aid.

Ensure that the lens and solar panels are clean. Wipe with a cloth dampened with mild soap and water, if necessary.

Cover the lantern with a shroud, jacket, blanket, etc., to simulate darkness. The lantern should flash on rhythm after a few seconds. It should stop flashing after the shroud is removed in the daytime. While covered, observe the LEDs through the lens. Dark sectors indicate that an LED cluster is not operating, necessitating replacement of the optic head. Contact Carmanah for replacement assemblies as there is a 3-year prorated warranty on all lanterns.